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same, is also $\frac{40!}{36! \cdot 4!} = \frac{40 \cdot 39 \cdot 38 \cdot 37}{1 \cdot 2 \cdot 3 \cdot 4}$.

The number of committees in which the chairman is selected, leaving 39 from whom to choose, is $\frac{39!}{36! \cdot 3!} = \frac{39 \cdot 38 \cdot 37}{6} = 9139$.

Also solved by G. B. M. ZERR.

151. Proposed by JOHN M. COLAW, A. M., Monterey, Va.

Solve the equations:

$$\begin{aligned}x + y + z + u + w &= 1, \\ax + by + cz + du + ew &= h, \\a^2x + b^2y + c^2z + d^2u + e^2w &= h^2, \\a^3x + b^3y + c^3z + d^3u + e^3w &= h^3, \\a^4x + b^4y + c^4z + d^4u + e^4w &= h^4.\end{aligned}$$

Solution by CLARENCE E. COMSTOCK, Professor of Mathematics, Bradley Polytechnic Institute, Peoria, Ill.

Solution by determinants.

$$x = \frac{\begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ h & b & c & d & e \\ h^2 & b^2 & c^2 & d^2 & e^2 \\ h^3 & b^3 & c^3 & d^3 & e^3 \\ h^4 & b^4 & c^4 & d^4 & e^4 \end{vmatrix}}{\begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ a & b & c & d & e \\ a^2 & b^2 & c^2 & d^2 & e^2 \\ a^3 & b^3 & c^3 & d^3 & e^3 \\ a^4 & b^4 & c^4 & d^4 & e^4 \end{vmatrix}} \equiv \frac{\Delta_{a=b}}{\Delta}.$$

By the factor theorem, we get

$$\Delta = (a-b)(a-c)(a-d)(a-e)(b-c)(b-d)(b-e)(c-d)(c-e)(d-e).$$

$\Delta_{a=h}$ = the same with a replaced by h .

$$\therefore x = \frac{(h-b)(h-c)(h-d)(h-e)}{(a-b)(a-c)(a-d)(a-e)}.$$

Since a, b, c, d, e appear in the same way, the principle of symmetry enables us to write the values y, z, u, w at once.

$$y = \frac{(h-a)(h-c)(h-d)(h-e)}{(b-a)(b-c)(b-d)(b-e)}, z = \frac{(a-h)(c-h)(d-h)(e-h)}{(b-a)(c-a)(d-a)(e-a)},$$

$$u = \frac{(a-h)(b-h)(c-h)(e-h)}{(a-d)(b-d)(c-d)(e-d)}, \text{ and } w = \frac{(a-h)(b-h)(c-h)(d-h)}{(a-e)(b-e)(c-e)(d-e)}$$

Solved in a similar manner by G. B. M. ZERR.

152. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Chemistry and Physics in The Temple College, Philadelphia, Pa.

Solve by a short original method, if possible: